The Southern Potato Wireworm

How To Control It on Irish Potatoes

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Wireworms are among the most destructive insect pests of potatoes in the United States. There are many species. The southern potato wireworm [1] is the species responsible for most wireworm damage to spring-crop Irish potatoes in the Southern States.

The southern potato wireworm is a relatively new pest in this country. Specimens of the insect were collected near Savannah, Ga., and Chadbourn, N.C., as early as 1927, but it was not recognized as a serious pest in North America until 1953. By 1955 it was present in every coastal State from North Carolina to Louisiana.

The insect is most abundant near the seacoast, but it has been found inland as far as 200 miles.

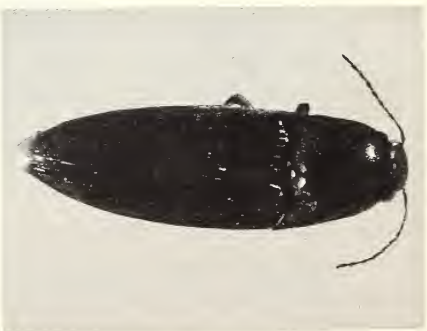
The southern potato wireworm causes economic loss by feeding on the underground parts of Irish potato, sweetpotato, beet, carrot, tobacco, tomato, and corn. It has also been known to damage tomato and strawberry fruits lying on the ground.

[1] *Conoderus falli.*

DESCRIPTION AND DEVELOPMENT

In its development, the southern potato wireworm has four stages: Egg, larva, pupa, and adult.

Adults of the wireworm are dark brown click beetles about ¼ inch long. They are active at night, and hide during the day under trash, lumps of soil, or parts of plants resting on the ground. The beetles are most abundant during summer and fall, but are present throughout the year in the warmer parts of their range.



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Adult southern potato wireworm. Greatly enlarged.

Egg laying begins in the spring as soon as night temperatures remain above 60° F., and continues until night temperatures are below that point in the fall. The eggs are laid in the soil. They are small and often are concealed by particles of earth that adhere to their sticky coating. The eggs hatch in 5 days during midsummer, but may take several weeks during cool weather in the spring or fall.

The larvae are white when they first emerge from the eggs, and later become cream colored or yellowish gray. They have reddish brown heads and tails. Their bodies are smooth and shiny. When fully grown, they are ½ to ¾ inch long.

Larvae are present throughout the year, but are most abundant during late summer and fall. Unless buried by plowing, they remain near the soil surface.

The larvae live in the soil in most types of cultivated land, in lawns, and in permanent pastures. They also live in uncultivated weedy areas, including fence rows and ditchbanks, but have not been found in woodlands. They feed on seeds, roots, tubers, stems, and fruits of various plants, and also on certain soil-inhabiting insects.

In midsummer, when temperatures are high and food plentiful, the larval stage may last only 30 days. It may last as many as 340 days under less favorable conditions. When fully grown, the larvae change to pupae in earthen cells under ground.

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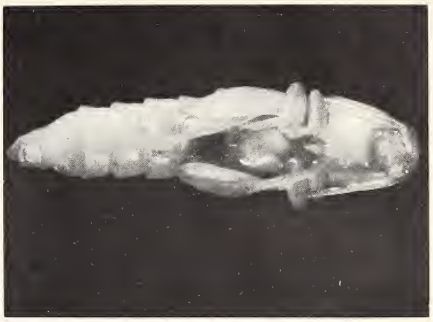
Larva of the southern potato wireworm. Greatly enlarged.



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Pupa. Greatly enlarged.

The pupae are slightly larger than the adult beetles. They are white when first formed, but soon change to creamy yellow. They can be found in soil during spring, summer, and fall. The pupae change into adults in 5 to 19 days.

DAMAGE TO POTATOES

The southern potato wireworm causes its most serious damage to spring-crop Irish potatoes in coastal South Carolina and Alabama, and in northeastern Florida. During the 10-year period 1952–61, a yearly average of 6.5 percent of the potatoes grown in untreated soil in the Charleston, S.C., area received enough wireworm injury to be regarded by market inspectors as showing insect "damage." Thus wireworm feeding alone caused the average crop of potatoes grown in untreated soil during that period to be ineligible for a U.S. Grade 1 rating, which allows no more than 6 percent of the tubers, by weight, to show damage from any cause.

The potatoes are damaged by larvae feeding on the tubers. Their feeding mars the appearance of potatoes and results in waste when the potatoes are prepared for cooking. Lots containing

Potatoes damaged by feeding of the southern potato wireworm.

badly damaged tubers either are downgraded and sold at reduced prices or are made eligible for top grades by discarding a sufficient number of the damaged tubers.

Most of the injury occurs as the potatoes approach maturity. However, the earlier the injury, the deeper the holes will be at harvest. In South Carolina, injury to spring-crop potatoes is caused mainly by wireworms hatching from eggs laid during late summer and early fall of the preceding year.

A population in the top 6 inches of soil of one wireworm per square foot is capable of causing economic loss. Three or more per square foot may cause serious damage.

CULTURAL PRACTICES

Certain cultural practices will reduce wireworm injury and may give adequate control in areas where the insect is not very abundant.

Weedy and grassy fields are favored by adults of the wireworm for egg laying, and the seed of these plants provide food for the young larvae. Therefore weeds, especially grasses, should not be allowed to grow during the preceding late summer and fall in fields to be planted to early-spring potatoes.

Avoid using millet, grain sorghum, and other grain crops as summer-fall cover crops to be followed by early-spring potatoes. Use a nongrain cover crop, such as soybeans. Plant the cover crop in rows and cultivate it to keep down weeds and grasses.

Turn the cover crop under in late fall or early winter. Plowing the soil and removing the vegetative cover from the soil surface will increase the chances of the wireworms being killed by winter freezes.

Harvest the potatoes as promptly as possible.

CONTROL WITH INSECTICIDE

In areas where the southern potato wireworm is known to be a pest, the only sure way to prevent its injury to potatoes is to use an effective insecticide. The following insecticidal control methods are recommended for the protection of Irish potatoes against this insect.

The southern potato wireworm has become resistant in some areas to certain soil insecticides. Consult local agricultural authorities for more specific information on resistant wireworm populations.

The accompanying table and other information will guide you in selecting the best insecticide and proper dosage to use.

How and When To Apply Insecticide

There are several satisfactory methods and times for applying an insecticide for southern potato wireworm control. The most commonly used method is to distribute the insecticide over the soil surface and mix it in. However, certain insecticides will protect spring-crop potatoes from the insect in some areas in the Southeast when applied to and through a cover crop during the preceding late summer and early fall.

Soil-surface application

You can apply an insecticide to the soil surface at any time after the remains of a fall crop are cut into the soil and before potatoes are planted during winter or early spring. Apply the insecticide as a wettable powder or liquid emulsifiable concentrate in a high- or low-gallonage sprayer, or apply it as granules with suitable equipment.

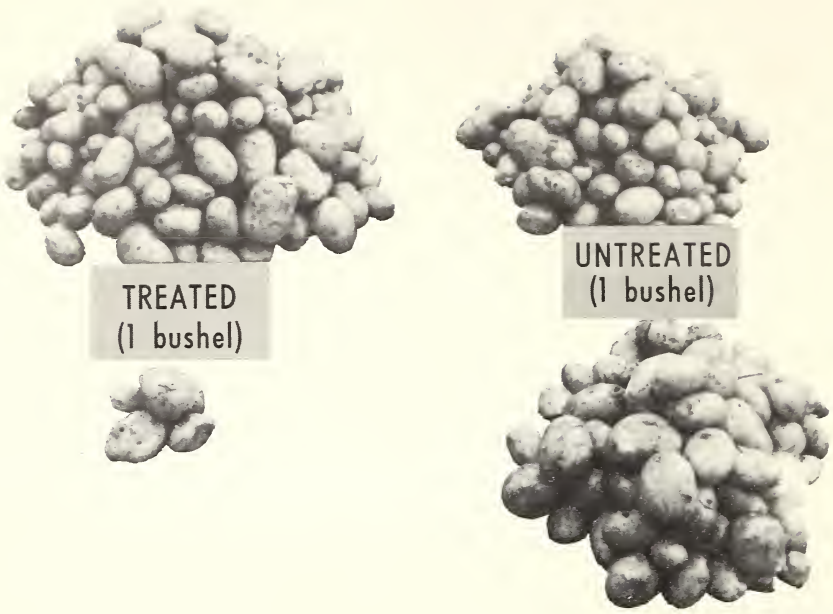
Because of hazards to persons applying the insecticide and danger of drift into surrounding areas, use of a dust is not recommended when a single full-dosage application of the insecticide is made directly to the soil surface.

An accurate dosage of the insecticide should be uniformly distributed over the entire soil surface and immediately stirred into the upper 4 to 6 inches with a double-disk harrow. If possible, apply the insecticide before the land is deeply plowed in fall or early winter. If it is necessary to apply the insecticide after a deep plowing, wait until the soil has been well settled by rain.

Diazinon and parathion.—These compounds are very toxic to the southern potato wireworm and will effectively rid the soil of the pest if properly used. They deteriorate rapidly when mixed into the soil and must contact the larvae soon after application if they are to be effective. This is particularly true of parathion.

Cover-crop application

Diazinon and parathion will protect spring-crop potatoes against the southern potato wireworm in some areas in the Southeast when applied to or through the



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Left: Bushel of potatoes grown in insecticide-treated soil. *Right:* Bushel of potatoes grown in untreated soil. Potatoes back of labels were not damaged. Those in front of labels were damaged by the southern potato wireworm. Note the great difference in amount of damage.

preceding cover crop. Such an application will kill the adults before the eggs are laid, and will kill the young larvae. These insecticides, particularly parathion, also will aid in the control of certain other kinds of insects that feed on the foliage of cover crops. When applying these compounds to cover crops, it is important that you observe the following instructions on timing the applications.

If intended solely for wireworm control, diazinon or parathion should be applied during the month before weekly mean air temperatures usually drop below about 70° F. For example, in the Charleston, S.C., area, where temperatures usually reach this point during the second week in October, the applications should be made during the last three weeks in September and the first week in October. Granular formulations will give best results, but high-gallonage sprays may be used on low-growing cover crops.

When it is desirable to control other insects feeding on the cover crop, as well as to prevent wireworm damage to the following potato crop, make at least two, preferably three, spray or dust applications of parathion at 10- to 14-day intervals. The first application should be made about 6 weeks before the weekly mean air temperatures usually drop below about 70° F.

When making a cover-crop application, you do not need to mix the insecticide into the soil; it is best not to disturb the cover crop until cool weather arrives.

TABLE 1.—Guide for selection and use of insecticides for control of the southern potato wireworm on spring-crop Irish potatoes

FOR APPLICATION TO SOIL PRIOR TO PLANTING OR TO FALL COVER CROP FOR CONTROL OF WIREWORMS ONLY

Insecticide	Amount of active ingredient to apply per acre	Common formulations that may be used [1]	Amount of formulation to apply per acre [2]
	Pounds		
Diazinon	1½ to 2	5-percent granules	30 to 40 pounds.
	1½ to 2	4-pounds-per-gallon EC	1½ to 2 quarts.
	1½ to 2	50-percent WP	3 to 4 pounds.
Parathion	3	4-percent granules	75 pounds.
	3	4-pounds-per-gallon EC	3 quarts.
	3	25-percent WP	12 pounds.

FOR APPLICATIONS (AT LEAST TWO, PREFERABLY THREE) TO FALL COVER CROPS FOR CONTROL OF WIREWORMS AND FOLIAGE-FEEDING INSECTS

Parathion	½ to ¾	2-percent dust	25 to 37½ pounds.
	½ to ¾	4-pounds-per-gallon EC	1 to 1½ pints.
	½ to ¾	25-percent WP	2 to 3 pounds.

[1] EC=emulsifiable concentrate; WP=wettable powder.

[2] If you use a product in which the percentage of active ingredient differs from that specified in this table, use proportionatley more or less of it.

Be sure that the insecticide you select has been tested and approved for use on the cover crop you intend to treat, and that the usage is in accordance with current insecticide usage regulations. Consult your local agricultural authorities for more specific information about this method of controlling the insect.

PRECAUTIONS

Insecticides are poisonous to man and animals; handle them with care. Follow the directions and heed all precautions on container labels. Read the label every time you use an insecticide; do not depend on your memory.

Keep insecticides in closed, well-labeled containers, in a dry place where they will not contaminate food or feed, and where children and pets cannot reach them.

Do not wear insecticide-contaminated clothing. Avoid repeated or prolonged contact of insecticides with the skin. Avoid prolonged inhalation of dusts or mists. After using insecticide, wash hands and face before eating or smoking.

Diazinon can be absorbed directly through the skin in harmful quantities. When working with this insecticide in any form, avoid spilling it on the skin and keep it out of the eyes, nose, and mouth. If any is spilled, wash it off the skin and change clothing immediately. If it gets in the eyes, flush them with plenty of water for 15 minutes and get medical attention.

Parathion is extremely poisonous and may be fatal if swallowed, inhaled, or absorbed through the skin. It should be applied only by a person thoroughly familiar with its hazards who will assume full responsibility for safe use and comply with all the precautions on the label. When applying parathion, wear a respirator or mask of a type that has been tested by the U.S. Department of Agriculture and found satisfactory for protection against this compound.

To protect fish and wildlife and sources of water supply, be careful not to contaminate streams, lakes, or ponds with insecticide. Do not clean spraying equipment or dump excess spray material near such water. Avoid contaminating nearby crops by drift of insecticide spray or dust. Avoid drift of insecticide into bee yards and to adjacent crops in bloom.

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